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SCHISTOSOMIASIS IN NEW YORK CITY

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THE present study is an examination of the recent pattern of schistosomiasis in New York City, a pattern of sporadic cases and clusters of cases among immigrants and travelers from endemic areas. The disease has been observed in New York since 1908.*

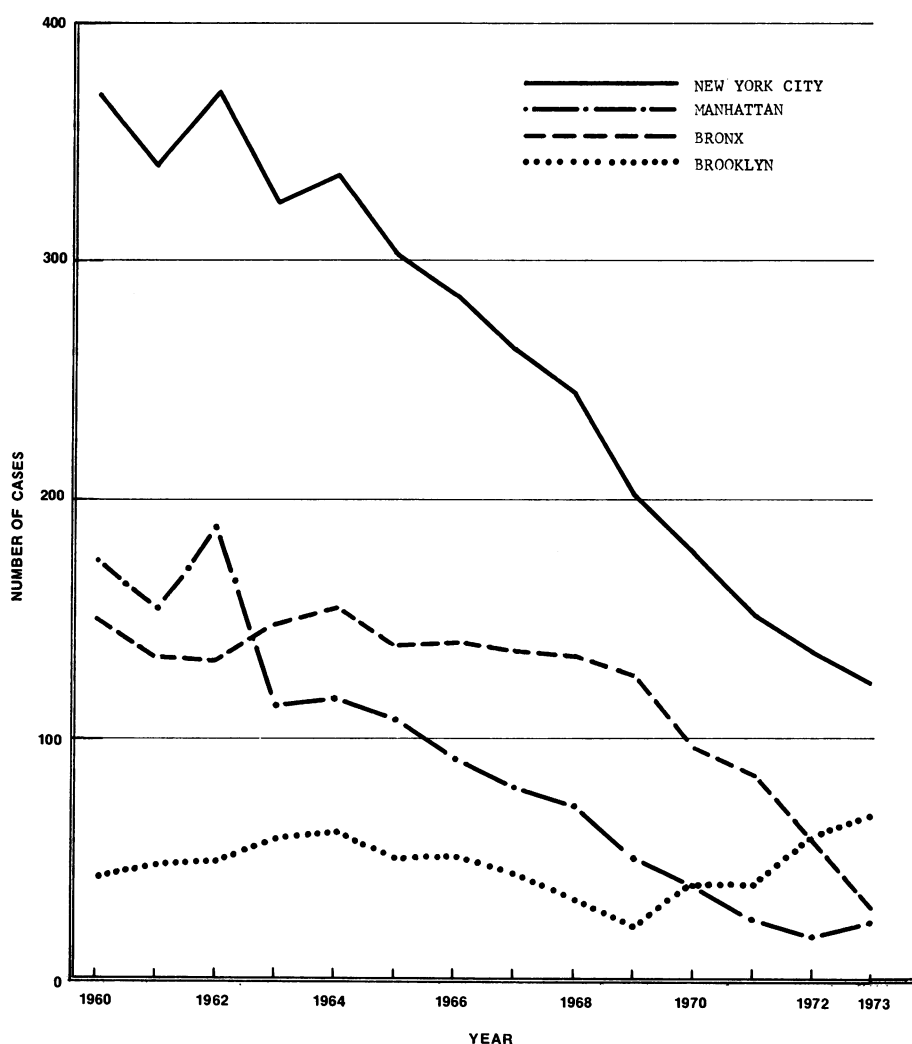
METHODS

In New York City schistosomiasis is a reportable disease. The morbidity data received between 1960 and 1973 by the Bureau of Infectious Disease Control and its predecessor the Bureau of Preventable Diseases were examined and analyzed.

RESULTS

Number of cases. The number of cases of schistomiasis reported in New York City in each year from 1960 through 1973 are shown

*Patterson, H. S.: Parasites found in New York City. *Arch. Int. Med.* 2:185, 1908.



Reported cases of schistosomiasis by borough, New York City, 1960 to 1973.

in the accompanying figure and in Table I. During this period of 14 years 3,643 cases were reported, of which 1,676 (46.0%) occurred in the Bronx, 1,265 (34.7%) in Manhattan, and 669 (18.3%) in Brooklyn. The boroughs of Queens and Richmond together accounted for only 33 cases, or 0.9%. Since 1962 the total number of cases reported has declined gradually from 371 in 1960 to 124 in 1973. This downward trend has also occurred in the principal reporting boroughs, except in

TABLE I. REPORTED CASES OF SCHISTOSOMIASIS BY BOROUGH AND YEAR, NEW YORK CITY, 1960 TO 1973

	<i>Brooklyn</i>	<i>Bronx</i>	<i>Manhattan</i>	<i>Queens</i>	<i>Richmond</i>	<i>Total</i>
1960	42	151	174	3	1	371
1961	47	134	155	3	1	340
1962	49	133	189	1	0	372
1963	58	149	114	4	0	325
1964	61	156	117	2	1	337
1965	51	140	109	4	0	304
1966	51	141	93	2	0	287
1967	44	138	81	0	1	264
1968	34	136	73	3	0	246
1969	22	128	51	2	0	203
1970	40	97	40	2	0	179
1971	39	86	26	2	0	153
1972	61	57	19	1	0	138
1973	70	30	24	0	0	124
Total	669	1,676	1,265	29	4	3,643

Brooklyn, where a gradual decline, beginning in 1966, was reversed in 1970. The number of cases reported from Brooklyn rose from 22 in 1969 to 70 in 1973. This reversal in Brooklyn is explained by the steadily increasing numbers of cases reported among recent Yemenite immigrants who live in the Bushwick section.

Age and sex distribution. The distribution by age and sex for the period from 1961 through 1971 is presented in Table II. The largest number of cases, 1,422 (47.3%), occurred among persons aged 25 to 44 years. More than two thirds of all cases, 2,027 (67.5%), were reported among persons between the ages of 20 and 44 years. The smallest number of cases, 325 (10.8%), occurred among persons less than 15 years of age. The over-all male-to-female ratio for the period from 1960 through 1971 is 1.9:1.

Race distribution. Since the race of the patient was specified in only 1,546 (51.4%) of the 3,005 cases reported between 1961 and 1971, it has been difficult to draw firm conclusions with regard to this factor (Table III). Among the patients whose race was specified, the overwhelming majority were white.

Nationality of surname. The nationality of the surname in cases reported from 1970 to 1973 in the three major schistosomiasis-reporting

TABLE II. REPORTED CASES OF SCHISTOSOMIASIS BY AGE AND SEX, AND SEX RATIOS OF REPORTED CASES, NEW YORK CITY, 1961 TO 1971

Sex	Age group (in years)									Total
	Less than 1	1-4	5-9	10-14	15-19	20-24	25-44	45+	Unknown	
Males	0	11	51	138	205	418	934	110	111	1,978
Females	0	9	24	91	109	187	488	64	47	1,019
Totals	0	20	75	229	314	605	1,422	174	158	2,997
Male:Female Ratio	0	1.2:1	2.1:1	1.5:1	1.9:1	2.2:1	1.9:1	1.7:1	2.4:1	1.9:1

TABLE III. REPORTED CASES OF SCHISTOSOMIASIS BY RACE AND SEX, NEW YORK CITY, 1961 TO 1971

Race	Male	Female	Unknown	Total
White	1,009	506	0	1,515
Nonwhite	20	11	0	31
Unknown	949	502	8	1,459
Total	1,978	1,019	8	3,005

boroughs is presented in Table IV. The proportion of patients with Spanish surnames in the Bronx has remained relatively stable at about 90% during the four-year period. In Brooklyn, however, the proportion with Spanish surnames declined from 76% in 1970 to 30.2% in 1973. Of the 69.8% of patients with non-Spanish surnames in Brooklyn in 1973, 65.7% were Yemenites. In Manhattan, Spanish surname cases declined from 92.3% in 1970 to 77.2% in 1973.

Cases among Yemenites. Of the 124 cases of schistosomiasis reported in 1973 in New York City, 50 (40.3%) occurred among Yemenites living in the borough of Brooklyn (Table V). By contrast, Yemenites accounted for 3.7% of all cases reported in New York City in 1970, 11.7% of all cases in 1971, and 14.5% of all cases in 1972. The age distribution of reported cases among Yemenites in Brooklyn from 1970 through 1973 is presented in Table VI. Of the total 95 cases reported among Yemenites during this period, 56 (58.9%) occurred among individuals 25 to 44 years of age. Only five cases (5.3%) occurred

TABLE IV. CASES OF SCHISTOSOMIASIS BY BOROUGH, YEAR OF REPORT,
AND NATIONALITY OF SURNAME

Year	Bronx		Brooklyn		Manhattan							
	Spanish surname No.	%	Non-Spanish surname No.	%	Spanish surname No.	%						
1970	88	92.7	7	7.3	38	76.0	12	24.0	36	92.3	3	7.7
1971	84	95.5	4	4.5	33	60.0	22	40.0	22	88.0	3	12.0
1972	48	90.6	5	9.4	39	66.1	20	33.9	13	76.4	4	23.6
1973*	24	88.9	3	11.1	23	30.2	53	69.8	17	77.2	5	22.8
Total	244	92.7	19	7.3	133	55.4	107	44.6	88	85.4	15	14.6

*Cases reported as of September 30, 1973

TABLE V. REPORTED CASES OF SCHISTOSOMIASIS
BY YEAR OF REPORT AND NATIONALITY, BROOKLYN, 1970 TO 1973

	<i>Spanish surname</i>		<i>Yemenite</i>		<i>Other</i>		<i>Total</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
1970	38	76.0	7	14.0	5	10.0	50	100.0
1971	33	60.0	18	32.7	4	7.2	55	100.0
1972	39	66.1	20	33.9	0	0.0	59	100.0
1973	23	30.2	50	65.7	3	3.9	76	100.0
Total	133	55.4	95	39.5	12	5.0	240	100.0

TABLE VI. REPORTED CASES OF SCHISTOSOMIASIS AMONG YEMENITES
BY AGE AND SEX, 1970 TO 1973

	<i>Age group (years)</i>									<i>Total</i>
	<i>Less than 1</i>	<i>1-4</i>	<i>5-9</i>	<i>10-14</i>	<i>15-19</i>	<i>20-24</i>	<i>25-44</i>	<i>45+</i>	<i>Unknown</i>	
1970	0	0	0	0	2	0	5	0	0	7
1971	0	0	0	3	1	4	9	0	1	18
1972	0	0	0	0	0	7	10	3	0	20
1973	0	0	1	1	7	6	32	1	2	50
Total	0	0	1	4	10	17	56	4	3	95

among children less than 15 years of age. The over-all male-to-female ratio is 12.6:1. In the 20-to-24-year age group the male-to-female ratio is 7.5:1 and in the 25-to-44-year age group 10.2:1.

DISCUSSION

Schistosomiasis is not rare in New York City. During the 14-year period from 1960 through 1973 a total of 3,643 cases were reported to the New York City Department of Health. Given the chronic nature of many infections and the frequent absence of major symptoms, it is probable that significant numbers of cases are not detected. In addition, many detected cases are not reported. Hence the true number of cases is undoubtedly much greater than the statistics indicate. During the period of our study, reporting of the disease in the city has remained stable.

Between 1960 and 1973 the number of cases reported declined by 66.4%. Because the majority of the infections in the city have been diagnosed among recent immigrants from the Caribbean, particularly Puerto Rico, the reasons for the decline are closely tied to changing immigration patterns and to programs for the control and treatment of schistosomiasis in Puerto Rico itself. Whereas the immediate postwar years and the 1950s witnessed a large immigration from Puerto Rico into New York City, the last decade has been characterized by a sharp decline in new immigrants.

As already noted, the rise in reported cases from Brooklyn beginning in 1970 can be explained by infections among the growing number of recent Yemenite immigrants who have settled in the Bushwick area. Virtually all of these cases have been diagnosed at the tropical-disease clinic operated by the Department of Health at the Bushwick Health Center.

The majority of cases of schistosomiasis have been reported from the boroughs of Brooklyn, Manhattan, and the Bronx; these are the areas which harbor most recent immigrants from endemic areas. In addition, the Department of Health operates tropical-disease clinics in these boroughs, providing free diagnostic, consultative, and treatment services. These clinics receive 8,000 patients and 33,000 visits per year. Many of the patients are travelers recently returned from endemic areas and are referred by private physicians. Thus, because of their location in areas of the city inhabited by recent immigrants from the tropics and their role as a referral resource, these clinics account for the vast majority of reported cases.

The majority of cases were diagnosed in adults between 20 and 44 years of age; children less than 15 years of age accounted for only 10.8%. This age distribution reflects the age distribution of the immigrant population, composed primarily of young adults who have lived in endemic areas long enough to acquire moderately heavy infections.

For the 12-year period from 1960 through 1971 the male-to-female ratio was 1.9:1. This ratio perhaps reflects the higher levels of utilization of clinics by males as compared to females or higher infection rates in males due to greater exposure in the tropics. The latter seems unlikely given the fairly intense and frequent exposure of women to contaminated waters in the tropics. The cases diagnosed among Yemenites in Brooklyn weigh heavily in determining this ratio. Among this group,

the male-to-female ratio has been 12.6:1. The preponderance of males among the Yemenite patients is due to the far greater utilization of the department's tropical-disease clinic in Bushwick by Yemenite males than by females. During the four-year period 1970 through 1973, 88 Yemenite males and only seven females at the Bushwick clinic were found to have schistosomiasis. Two reasons explain why so few Yemenite females come to the clinic. First, the immigration pattern among these people, as among many other groups, is one in which the men immigrate first, followed some time later by their wives and children. The simultaneous immigration of an entire family is exceptional. Consequently the Yemenite community in Bushwick is characterized by a preponderance of males. Second, women in this strict Moslem society are kept socially confined; thus, those who are present in the community do not frequent medical facilities.

An analysis of surnames between 1970 and 1973 revealed that patients with Spanish surnames have comprised approximately 90% of all cases in the Bronx. In Manhattan the proportion with Spanish surnames declined from 92.3% in 1970 to 77.2% in 1973. The decline in Manhattan is accounted for by a falloff in the number of cases diagnosed among immigrants from the Caribbean and a steady level of cases reported among recently returned travelers referred to the Department's Lower East Side Tropical Disease clinic.

In Brooklyn, as in Manhattan and the Bronx, there has been a steady decline in the total annually reported number of patients with Spanish surnames. However, the total number of cases in Brooklyn has increased steadily because of infections diagnosed among Yemenite immigrants, who in 1973 accounted for 65.7% of all reported cases in the borough and 40.3% in the entire city.

There is an older Yemenite community in Brooklyn, concentrated in the Borough Hall area around the foot of Atlantic Avenue. These Yemenites, who immigrated to New York after World War II and during the 1950s, accounted for considerable numbers of cases of schistosomiasis during the 1950s and early 1960s, most of which were diagnosed and treated at the tropical-disease clinic of the Long Island College Hospital.* This community is now composed of fairly stable family units with little new immigration.

The vast majority of cases of schistosomiasis reported in New York

*Mullin, W. G.: Personal communication. 1974.

City during the period of this study were *Schistosoma mansoni* infections. Several cases of *Schistosoma hematobium* were reported and none of *Schistosoma japonicum*.

The future epidemiologic pattern of schistosomiasis in New York City will be determined by future immigration and by the effectiveness of schistosomiasis-control programs in endemic areas.

SUMMARY

The epidemiology of schistosomiasis in New York City has been presented in detail. Since 1962 there has been a steady decline in the number of cases reported each year. During the period from 1960 through 1973 the majority of cases were reported among persons with Spanish surnames, mostly immigrants from Puerto Rico. Since 1970 immigrants from Yemen have accounted for the steadily rising number of cases reported from Brooklyn. In 1973 Yemenites in Brooklyn accounted for 40.3% of all reported cases in the city.

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